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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,262	12/04/2006	Hisashi Koga	4600-0119PUS1	3029
2292	7590	10/24/2007	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH			LOCKARD, JON MCCLELLAND	
PO BOX 747				
FALLS CHURCH, VA 22040-0747			ART UNIT	PAPER NUMBER
			1647	
			NOTIFICATION DATE	DELIVERY MODE
			10/24/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/573,262	KOGA ET AL.	
	Examiner	Art Unit	
	Jon M. Lockard	1647	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 23 March 2006.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) \_\_\_\_\_ is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) 1-19 are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application
- 6) Other: sequence alignments.

**DETAILED ACTION*****Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-4, 7-8, 12, and 16, drawn to polynucleotides, vectors and host cells comprising the same, and compositions and kits comprising the same.

Group II, claim(s) 5-6, 14, and 19, drawn to polypeptides, and kits and compositions comprising the same.

Group III, claim(s) 9, drawn to transgenic organisms.

Group IV, claim(s) 10 and 18, drawn to antibodies, and compositions and kits comprising the same.

Group V, claim(s) 11 and 15, drawn to a screening method utilizing a polynucleotide or cells comprising said polynucleotide.

Group VI, claim(s) 13, drawn to a screening method utilizing a polypeptide.

Group VII, claim(s) 17, drawn to a screening method utilizing an antibody.

2. The inventions listed as Groups I-VII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group I is directed to a DNA comprising a base sequence encoding a polypeptide comprising the full length or a part of an amino acid sequence which is the same or substantially the same as an amino acid sequence represented by SEQ ID NO:1. However, since van der Zwaag et al. (Dev. Dyn. 225:336-343, 2002) teach a cDNA (accession no. AY116661) that encodes a PLEXIN-D1 polypeptide (See Fig. 1) that shares 92% sequence identity to SEQ ID NO:1 (See attached sequence alignment), and thus encodes part of an amino acid sequence which is the same or substantially the same as SEQ ID NO:1, no special technical feature exists for group I as defined by PCT Rule 13.2, because it does not define a

contribution over the prior art. Because the technical feature of Group I is not a special technical feature, and because the technical features of the Groups II-VII inventions is not present in the Group I claims, unity of invention is lacking. Furthermore, the polynucleotides of Group I, the polypeptides of Group II, the transgenic organisms of Group III, and the antibodies of Group IV are structurally and functionally different chemical compounds, having different structures and activities, or in the case of the transgenic animals an organism, and each of which can be made and used without the other compounds. The methods of Groups V, VI, and VII require compounds which are functionally different from each other and each can be made and used without the other. Lack of unity is shown because these compounds lack a common utility which is based upon a common structural feature which has been identified as the basis for that common utility.

***Further Restriction Within Groups I-VII***

3. Whichever Group is elected, further restriction within the elected Group is required to one of the following:

Applicants must further elect *one* polypeptide and the corresponding nucleic acid that encodes said polypeptide selected from SEQ ID NO: (encoded by SEQ ID NO:2), SEQ ID NO:15 (encoded by SEQ ID NO:16), or SEQ ID NO:18 (encoded by SEQ ID NO:19)

4. The polypeptides and polynucleotide molecules do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Each polypeptide and polynucleotide molecule represents a structurally and functionally different chemical compound from each other, having different chromosomal locations and sequences for the nucleic acids, and having different amino acid sequences, structures and activities for the polypeptides, each of which can be made and used without the other compounds. Accordingly, the methods of using the compounds are also, therefore, different methods. Lack of unity is shown because these compounds and methods lack a common utility which is based upon a common structural feature

which has been identified as the basis for that common utility.

5. **Applicants are advised that this is not a species election.**

6. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

7. In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

8. **Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.**

9. The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

10. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

11. Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

12. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Advisory Information***

Effective November 1, 2007, if applicant wishes to present more than 5 independent claims or more than 25 total claims in an application, applicant will be required to file an examination support document (ESD) in compliance with 37 CFR 1.265 before the first Office action on the merits (hereafter “5/25 claim threshold”). See Changes to Practice for Continued Examination Filings, Patent Applications Containing Patentably Indistinct Claims, and Examination of Claims in Patent Applications, 72 Fed. Reg. 46715 (Aug. 21, 2007), 1322 Off. Gaz. Pat. Office 76 (Sept. 11, 2007) (final rule). The changes to 37 CFR 1.75(b) apply to any pending applications in which a first Office action on the merits (FAOM) has not been mailed before November 1, 2007. Withdrawn claims will not be taken into account in determining whether an application exceeds the 5/25 claim threshold. For more information on the final rule, please see <http://www.uspto.gov/web/offices/pac/dapp/opla/presentation/clmcontfinalrule.html>.

In response to the restriction requirement set forth in this Office action, applicant is required to file an election responsive to the restriction requirement. Applicant may not file a suggested restriction requirement (SRR) in lieu of an election responsive to the restriction requirement as a reply. A SRR alone will not be considered a *bona-fide* reply to this Office action.

If applicant elects an invention that is drawn to no more than 5 independent claims and no more than 25 total claims, applicant will not be required to file an ESD in compliance with 37 CFR 1.265 that covers each of the elected claims. If the elected invention is drawn to more than 5 independent claims or more than 25 total claims, applicant may file an amendment canceling a number of elected claims so that the elected invention would be drawn to no more than 5 independent claims and no more than 25 total claims.

If the restriction requirement is mailed on or after November 1, 2007, applicant is also required to file an ESD in compliance with 37 CFR 1.265 that covers each of the elected claims, unless the elected invention is drawn to no more than 5 independent claims and no more than 25 total claims taking into account any amendment to the claims. To avoid the abandonment of the

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application, the ESD (if required) and the election must be filed within **TWO MONTHS** from the mailing date of this Office action. The two-month time period for reply is extendable under 37 CFR 1.136.

If the restriction requirement is mailed before November 1, 2007, the election must be filed within **ONE MONTH** or **THIRTY DAYS**, whichever is longer, from the mailing date of this Office action. The time period for reply is extendable under 37 CFR 1.136. Furthermore, if the elected invention is drawn to more than 5 independent claims or more than 25 total claims taking into account any amendment to the claims, the Office will notify applicant and provide a time period in which applicant is required to file an ESD in compliance with 37 CFR 1.265 covering each of the elected claims or amend the application to contain no more than 5 independent elected claims and no more than 25 total elected claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Jon M. Lockard** whose telephone number is **(571) 272-2717**. The examiner can normally be reached on Monday through Friday, 7:00 AM to 4:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Manjunath N. Rao**, can be reached on **(571) 272-0939**.

The fax number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).



Jon M. Lockard, Ph.D.  
October 18, 2007

RT and mouse cDNA sequences.";  
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).  
RN [4]  
RP GLYCOSYLATION [LARGE SCALE ANALYSIS] AT ASN-500, AND MASS  
RP SPECTROMETRY.  
RX PubMed=16335952; DOI=10.1021/pr0502065;  
RA Liu T., Qian W.-J., Gritsenko M.A., Camp D.G. II, Monroe M.E.,  
RA Moore R.J., Smith R.D.;  
RT "Human plasma N-glycoproteome analysis by immunoaffinity subtraction,  
RT hydrazide chemistry, and mass spectrometry.";  
RL J. Proteome Res. 4:2070-2080(2005).  
CC -!- ALTERNATIVE PRODUCTS:  
CC Event=Alternative splicing; Named isoforms=2;  
CC Name=1;  
CC IsoId=Q9Y4D7-1; Sequence=Displayed;  
CC Name=2;  
CC IsoId=Q9Y4D7-2; Sequence=VSP\_011516;  
CC -!- TISSUE SPECIFICITY: Detected at low levels in heart, placenta,  
CC lung, skeletal muscle, kidney, thymus and liver. Detected at very  
CC low levels in brain, colon, spleen, small intestine and peripheral  
CC blood leukocytes.  
CC -!- SIMILARITY: Belongs to the plexin family.  
CC -!- SIMILARITY: Contains 3 IPT/TIG domains.  
CC -!- SIMILARITY: Contains 1 Sema domain.  
CC -----  
CC Copyrighted by the UniProt Consortium, see <http://www.uniprot.org/terms>  
CC Distributed under the Creative Commons Attribution-NoDerivs License  
CC -----  
DR EMBL; AB014520; BAA31595.1; ALT\_INIT; mRNA.  
DR EMBL; AY116661; AAM49063.1; -; mRNA.  
DR EMBL; BC003526; AAH03526.1; -; mRNA.  
DR EMBL; BC011848; AAH11848.1; -; mRNA.  
DR UniGene; Hs.301685; -.  
DR Ensembl; ENSG00000004399; Homo sapiens.  
DR HGNC; HGNC:9107; PLXND1.  
DR MIM; 604282; gene.  
DR InterPro; IPR002909; IPT\_TIG\_rcpt.  
DR InterPro; IPR003659; Plexin-like.  
DR InterPro; IPR013548; Plexin\_cytopl.  
DR InterPro; IPR002165; Plexin\_repeat.  
DR InterPro; IPR008936; Rho\_GAP.  
DR InterPro; IPR001627; Sema.  
DR Pfam; PF08337; Plexin\_cytopl; 1.  
DR Pfam; PF01437; PSI; 2.  
DR Pfam; PF01403; Sema; 1.  
DR Pfam; PF01833; TIG; 3.  
DR SMART; SM00429; IPT; 3.  
DR SMART; SM00423; PSI; 3.  
DR SMART; SM00630; Sema; 1.  
DR PROSITE; PS51004; SEMA; 1.  
KW Alternative splicing; Glycoprotein; Membrane; Polymorphism; Receptor;  
KW Repeat; Signal; Transmembrane.  
FT SIGNAL 1 46 Potential.  
FT CHAIN 47 1925 Plexin-D1.  
FT /FTId=PRO\_0000024676.  
FT TOPO\_DOM 47 1271 Extracellular (Potential).  
FT TRANSMEM 1272 1292 Potential.

# Sequence Alignments

10/573,262

RESULT 4

PLXD1\_HUMAN

ID PLXD1\_HUMAN STANDARD; PRT; 1925 AA.  
AC Q9Y4D7; Q6PJS9; Q8IZJ2; Q9BTQ2;  
DT 31-AUG-2004, integrated into UniProtKB/Swiss-Prot.  
DT 31-AUG-2004, sequence version 2.  
DT 25-JUL-2006, entry version 36.  
DE Plexin-D1 precursor.  
GN Name=PLXND1; Synonyms=KIAA0620;  
OS Homo sapiens (Human).  
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;  
OC Mammalia; Eutheria; Euarchontoglires; Primates; Haplorrhini;  
OC Catarrhini; Hominidae; Homo.  
OX NCBI\_TaxID=9606;  
RN [1]  
RP NUCLEOTIDE SEQUENCE [LARGE SCALE mRNA] (ISOFORM 1).  
RC TISSUE=Brain;  
RX MEDLINE=98403880; PubMed=9734811; DOI=10.1093/dnare/5.3.169;  
RA Ishikawa K., Nagase T., Suyama M., Miyajima N., Tanaka A., Kotani H.,  
RA Nomura N., Ohara O.;  
RT "Prediction of the coding sequences of unidentified human genes. X.  
RT The complete sequences of 100 new cDNA clones from brain which can  
RT code for large proteins in vitro.";  
RL DNA Res. 5:169-176(1998).  
RN [2]  
RP NUCLEOTIDE SEQUENCE [mRNA] (ISOFORM 1), AND TISSUE SPECIFICITY.  
RX MEDLINE=22299888; PubMed=12412018; DOI=10.1002/dvdy.10159;  
RA van der Zwaag B., Hellemons A.J.C.G.M., Leenders W.P.J.,  
RA Burbach J.P.H., Brunner H.G., Padberg G.W., Van Bokhoven H.;  
RT "PLEXIN-D1, a novel plexin family member, is expressed in vascular  
RT endothelium and the central nervous system during mouse  
RT embryogenesis.";  
RL Dev. Dyn. 225:336-343(2002).  
RN [3]  
RP NUCLEOTIDE SEQUENCE [LARGE SCALE mRNA] OF 1386-1925 (ISOFORMS 1 AND  
RP 2).  
RC TISSUE=Muscle, and Uterus;  
RX MEDLINE=22388257; PubMed=12477932; DOI=10.1073/pnas.242603899;  
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,  
RA Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D.,  
RA Altschul S.F., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,  
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,  
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,  
RA Stapleton M., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,  
RA Brownstein M.J., Usdin T.B., Toshiyuki S., Carninci P., Prange C.,  
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullahy S.J.,  
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,  
RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,  
RA Villalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,  
RA Fahey J., Helton E., Ketteman M., Madan A., Rodrigues S., Sanchez A.,  
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,  
RA Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,  
RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,  
RA Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smailus D.E.,  
RA Schnurch A., Schein J.E., Jones S.J.M., Marra M.A.;  
RT "Generation and initial analysis of more than 15,000 full-length human

FT	TOPO_DOM	1293	1925	Cytoplasmic (Potential).
FT	DOMAIN	47	546	Sema.
FT	DOMAIN	891	979	IPT/TIG 1.
FT	DOMAIN	981	1066	IPT/TIG 2.
FT	DOMAIN	1069	1160	IPT/TIG 3.
FT	CARBOHYD	86	86	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	155	155	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	188	188	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	224	224	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	481	481	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	500	500	N-linked (GlcNAc. . .).
FT	CARBOHYD	583	583	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	696	696	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	736	736	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	802	802	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	965	965	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	1017	1017	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	1060	1060	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	1099	1099	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	1118	1118	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	1132	1132	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	1237	1237	N-linked (GlcNAc. . .) (Potential).
FT	CARBOHYD	1257	1257	N-linked (GlcNAc. . .) (Potential).
FT	VAR_SEQ	1766	1925	SLPLRFWVNILKNPQFVFDIDKTDHIDACLSVIAQAFIDAC SISDLQLGKDSPTNKLLYAKEIPEYRKIVQRYYKQIQDMTP LSEQEMNAHLAEESRKYQNEFNTNVAMAEIYKYAKRYRPQI MAALEANPTARRTQLQHKFEQVVALMEDNIYECYSEA -> RWRPSSPVLGEHPEEPVCL (in isoform 2). /FTId=VSP_011516.
FT	VARIANT	870	870	M -> V (in dbSNP:2255703). /FTId=VAR_022144.
SQ	SEQUENCE	1925	AA;	212095 MW; 26001F5D0B2A80E5 CRC64;

Query Match 92.2%; Score 8468; DB 1; Length 1925;  
Best Local Similarity 91.9%; Pred. No. 0;  
Matches 1606; Conservative 52; Mismatches 88; Indels 2; Gaps 1;

Qy	1	SMLNVAANHPNASTVGLVLPPSGTGGSRLLVGATYTGFGSAFFPRNRSLEDHRFENTPE	60
		:                 :   :	
Db	178	SMLNVAANHPNASTVGLVLPPAAGAGGSRLLVGATYTGSSFFPRNRSLEDHRFENTPE	237
		:   :	
Qy	61	IAIRSLDARGDLAKLFTFDLNPSDDNILKIKQGAKEQHKLGFVRAFLHPAVPPHSAQPYA	120
		:	
Db	238	IAIRSLDTRGDLAKLFTFDLNPSDDNILKIKQGAKEQHKLGFVSAFLHPSDPPPQSYA	297
Qy	121	YLALNSEARAGDKDSQARSLLARICLPRGAGGDAKKLTESYIQLGLQCAGGAGRGDLYSR	180
		:	
Db	298	YLALNSEARAGDKESQARSLLARICLPHGAGGDAKKLTESYIQLGLQCAGGAGRGDLYSR	357
Qy	181	LVSVFPAEQFFAVFERPQGAPGARNAPAALCAFRRDDVQAAIRAARTACFVEPAPDVVA	240
		:         :                 :	
Db	358	LVSVFPARERLFAVFERPQGSPAARAAPAALCAFRRADVRAAIRAARTACFVEPAPDVVA	417
Qy	241	VLDSVVQGTGPACESKRNIQLQPEQLDCGA AHLQHPLTILQPLRASP VFRAPGLTAVAVA	300
		:   :   :         :	
Db	418	VLDSVVQGTGPACERKLNIQLQPEQLDCGA AHLQHPLSILQPLKATPVFRAPGLTAVAVA	477

Qy	301	SANNYTAFLGTATGRLLKISLNESMQVSRRVLTVAYGEPVHHVMQFDPMDPGYLYLMT	360
Db	478	SVNNYTAFLGTVNGRLLKINLNESMQVSRRVVTVAYGEPVHHVMQFDPADSVYLYLMT	537
Qy	361	SHQMARVKVAACEVHSTCGDCVGAADAYCGWCTLETRCTLQQDCTNSSQPHFWTSASEGP	420
Db	538	SHQMARVKVAACNVHSTCGDCVGAADAYCGWCALETRCTLQQDCTNSSQQHFWTSASEGP	597
Qy	421	SRCPAMTVPSEIDVHRDYTGMLQISGSLPSLSGMEMACDYGNGVRTVARVPGPAYDHQ	480
Db	598	SRCPAMTVPSEIDVRQEYPGMILQISGSLPSLSGMEMACDYGNNIRTVARVPGPAFGHQ	657
Qy	481	IAYCNLLPRAQFPSFPAGQDHVTVEMSVRVKGNHIVSANFTIYDCSRIGQVYPHTACTSC	540
Db	658	IAYCNLLPRDQFPFPNQDHVTVEMSVRVNGRNIVKANFTIYDCSRTAQVYPHTACTSC	717
Qy	541	LSTQWPCSWCIQLHSCVSNQSQCQDSPNPTSPQDCPQILPSPLAPVPTGGSQDILVPLTK	600
Db	718	LSAQWPCFWCSQQHSCVSNQSRCEASPNTSPQDCPRTLLSPLAPVPTGGSQNLIVPLAN	777
Qy	601	ATFFHGSSLECSFGLLEESFEAVWANNSLVRCNQVVLHTTQKSQVFPLSLKLKGPPDRFLD	660
Db	778	TAFFQGAALECSFGLLEEIFEAVWVNESVVRCDQVVLHTTRKSQVFPLSLQLKGRPARFLD	837
Qy	661	SPNPMTVVVYNCAMGSPDCSQCLGREDLGHLCVWNDGCRRLGPLQPLPGTCPAPEIRAI	720
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Qy	721	PLSGPLDGTLTIRGRNLGRRLSDVAHGVWIGSVACEPLADRYTVSEEIVCATGPAAGA	780
Db	898	PLSGPLDGTLTIRGRNLGRRLSDVAHGVWIGGVACEPLPDRTVSEEIVCVTGPAPGP	957
Qy	781	FSDVVTVNVSKEGRSREQFSYVLPTVHSLEPMGPKAGGTRITIHGSDLNVGSMQLQVLN	840
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Qy	901	RSPVSGGRTITVAGERFHMVQNVSMAVHIGREPTFCKVLNSTLITCPSPGALSNASAPV	960
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Qy	961	DFFINGRAYADE--AAEELLDPAEAQRGSFRFLDYLPNPQFSTAKREWKIHHPGEPLTL	1018
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Qy	1019	VIHKEQDSLGLSHEYHIKIGQVSCDIQIISDRVIHCSVNESLGTAEQQLPITIQVGNFN	1078
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Qy	1139	IREEIRKGFAELQTDMDLTKELNRSQGIPFLEYKHFVTRFFPKCSSLYEERYVLPSKT	1198

Db 1318 IREEIRKGFAELQTDMDTLTKELNRSQGIPFLEYKHFVTRTFPKCSSLYEERYVLPSQT 1377  
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RESULT 6  
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DEFINITION Homo sapiens plexin D1 (PLXND1) mRNA, complete cds.  
ACCESSION AY116661  
VERSION AY116661.1 GI:24953986  
KEYWORDS  
SOURCE Homo sapiens (human)  
ORGANISM Homo sapiens  
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;  
Mammalia; Eutheria; Euarchontoglires; Primates; Haplorrhini;  
Catarrhini; Hominidae; Homo.  
REFERENCE 1 (bases 1 to 7095)  
AUTHORS Van Der Zwaag, B., Hellemons, A.J., Leenders, W.P., Burbach, J.P.,  
Brunner, H.G., Padberg, G.W. and Van Bokhoven, H.  
TITLE PLEXIN-D1, a novel plexin family member, is expressed in vascular  
endothelium and the central nervous system during mouse  
embryogenesis  
JOURNAL Dev. Dyn. 225 (3), 336-343 (2002)  
PUBMED 12412018  
REFERENCE 2 (bases 1 to 7095)  
AUTHORS van der Zwaag, B. and van Bokhoven, H.  
TITLE Direct Submission  
JOURNAL Submitted (31-MAY-2002) Neurology, UMC Nijmegen, Reinier Postlaan  
4, Nijmegen, Gelderland 6525 GC, The Netherlands  
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<b>Qy</b>	61	CGCCTACCTCGGGCACCGGGGGCAGCGTCTGCTCGTGGCGCCACGTACACCGGCT	120
<b>Db</b>	770	CTCCCGCCGCCGGCGCGGGGGCAGCCGCTGCTCGTGGCGCCACGTACACCGGTT	829
<b>Qy</b>	121	GCAGCGCTTCTTCCCGCAACCGTAGCCTAGAACGACCACCGCTTCGAGAACACGCC	180
<b>Db</b>	830	GCAGCTCCTTCTTCCCGCAACCGCAGCCTGGAGGACCCGCTTCGAGAACACGCC	889
<b>Qy</b>	181	AGATCGCTATCCGCTCCCTGGACCGCGTGGAGACTTGGCAAGCTTCACCTTCG	240
<b>Db</b>	890	AGATGCCATCCGCTCCCTGGACACCGCGGGGACCTGGCAAGCTTCACCTTCG	949
<b>Qy</b>	241	TTAACCGTCGGACGATAACATCCTGAAGATCAAGCAGGGCGCAAGGAGCAGCAC	300
<b>Db</b>	950	TCAACCCCTCCGACGACAACATCCTCAAGATCAAGCAGGGCGCAAGGAGCAGCAC	1009
<b>Qy</b>	301	TGGGCTTCGTGCGTGCCTTCTGCACCCGGCGGTGCCACCGCACAGCGCGAGCC	360
<b>Db</b>	1010	TGGGCTTCGTGAGCGCCTCCTGCACCCGTCCGACCCGGCCGGGTGCACAGTC	1069
<b>Qy</b>	361	CGTACCTGGCGCTAACAGCGAGGCGCGTGCAGGGGACAAGGACAGCCAGGCGC	420
<b>Db</b>	1070	CGTACCTGGCGCTAACAGCGAGGCGCGCGGGGACAAGGAGAGGCCAGGCGGGAG	1129
<b>Qy</b>	421	TGCTGGCGCGCATCTGCCTGCCCCGGCGCGGGTGGCACGCCAAGAAGCTAC	480

Db	1970	CCAGCCGCTGCTGCCATGACCGTCTGCCTCCGAGATCGATGTGCGCCAGGAGTACC	2029
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Db	2030	CAGGCATGATCCTGCAGATCTCGGGCAGCCTGCCAGCCTCAGTGGCATGGAGATGGCCT	2089
Qy	1381	GTGACTATGGAAATGGCGTTCGAACGGTGGCCCGGGTACCTGGCCCTGCCTATGATCATC	1440
Db	2090	GTGACTATGGAAACAACATCCGACTGTGGCTCGGGTCCCAAGGCCCTGCCTTGGTCACC	2149
Qy	1441	AGATTGCCTACTGCAATCTCCTGCCAGGGCCAGTTCCATCCTTCCTGCTGGCCAGG	1500
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Qy	1501	ACCACGTGACCGTTGAGATGTCTGTAAGGGTCAAAGGACACAACATTGTCTCAGCCAATT	1560
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Qy	1561	TCACCATCTACGACTGCAGCGAATTGGACAAGTCTACCCCCATACAGCCTGTACCAGCT	1620
Db	2270	TCACCATCTACGACTGCAGCGCACTGCACAAGTGTACCCCCACACAGCCTGTACCAGCT	2329
Qy	1621	GCCTGTCCACACAGTGGCCTTGCCTGGTGCATCCAGCTGCATTCATGTGTCTCCAACC	1680
Db	2330	GCCTGTGGCACAGTGGCCTGTTCTGGTGCAGCCAGCAGCCTGTGTTCCAACC	2389
Qy	1681	AGTCTCAGTGCCAGGACTGCCAACCCCCACGAGTCCTCAGGACTGTCCCCAGATCCTGC	1740
Db	2390	AGTCTCGGTGCGAGGCCTCACCAAAACCCACGAGCCCTCAGGACTGCCCGGACCTGC	2449
Qy	1741	CCTCGCCCCTAGCGCCCGTGCCACAGGTGGCTCCAAGACATCCTGGTCCCCGTACTA	1800
Db	2450	TCTCACCCCTGGCACCCGTGCCTACGGGTGGCTCCAGAACATCCTGGTGCCTCTGGCCA	2509
Qy	1801	AAGCCACCTCTCCATGGTCTCCCTCGAGTCAGCTTGGGCTGGAAGAGAGCTTTG	1860
Db	2510	ACACTGCCTTTCCAGGGTGCAGCCCTGGAGTGTAGTTGGCTGGAGGAGATCTCG	2569
Qy	1861	AGGCTGTATGGCGAATAACTCACTGGTCCGCTGCAACCAAGTGGTCTGCACACAACCC	1920
Db	2570	AGGCTGTGTGGGTGAATGAGTCTGTTGACGCTGTGACCAGGTGGTGCACACGACCC	2629
Qy	1921	AGAAGAGCCAGGTATTCACGTGAGTCAGCTGAAGCTGAAGGGCCAGACCGATTCTAG	1980
Db	2630	GGAAGAGCCAGGTGTTCCCGCTCAGCCTCAACTAAAGGGCGGCCAGCCGATTCTGG	2689
Qy	1981	ACAGCCCTAACCCCATGACAGTTGGTCTACAACGTGCTATGGCAGCCCTGACTGTT	2040
Db	2690	ACAGCCCTGAGCCCATGACAGTCATGGTCTATAACTGTGCCATGGCAGCCCCGACTGTT	2749
Qy	2041	CCCAGTGCCTGGCCGTGAGGACCTGGTCACCTCTGTGTTGGAATGATGGCTGTCGTC	2100
Db	2750	CCCAGTGCCTGGCCGCGAAGACCTGGTCACCTGTGCATGTGGAGTGTGGCTGCCGCC	2809
Qy	2101	TAAGAGGGCCCTGCAGCCACTCCCTGGCACCTGCCAGCCCTGAAATCCGAGCGATTG	2160
Db	2810	TGCGGGGGCCTCTGCAGCCCATGGCTGGCACCTGCCCGCCCCGAGATCCGCGCGATTG	2869

Db	1130	TGCTGGCGCGCATCTGCCTGCCCAACGGCGCCGGCGACGCCAAGAAGCTACCGAGT	1189
Qy	481	CCTACATCCAACACTGGGCTTGCAGTGCAGCGGGCGCGCGGGCGCGACCTACAGCC	540
Db	1190	CCTACATCCAGTTGGGCTTGCAGTGCAGCGGGCGCGCGGGCGCGACCTACAGCC	1249
Qy	541	GCCTCGTGTGGTTTCCCCCGCGCGAGCAGTTCTCGCCGTCTCGAGCGGGCCCCAGG	600
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Db	1370	GAGCCGCCATCCGAGCTGCGCGCACCGCCTGCTTCGTGGAACCGGCCGACGTGGTGG	1429
Qy	721	CGGTGTTGGACAGTGTGGCAGGGCACCGGGCCGGCTGCAGAGAGCAAGCGCAACATAC	780
Db	1430	CGGTGCTCGACAGCGTGGCAGGGCACGGACCGGCCTGCGAGCGCAAGCTAACATCC	1489
Qy	781	AGCTGCAGCCGGAGCAACTGGATTGGGAGCGGGCCCACCTGCAGCACCCACTGACCATCC	840
Db	1490	AGCTCCAGCCAGAGCAGCTGGACTGTGGAGCTGCTCACCTGCAGCACCGCTGTCCATCC	1549
Qy	841	TGCAGCCGCTGAGGGCATCGCCCGTGTTCGTGCTCCAGGGCTCACGGCCGTGGCTGTGG	900
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Qy	901	CCAGTGCCAACAACATACACGGCGTCTTCTGGGACCGCCACAGGGAGGCTCTCAAGA	960
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Qy	961	TCAGCCTGAACGAGAGCATGCAGGTAGTAAGCAGGGCGAGTGTGACTGTAGCCTATGGGG	1020
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Qy	1021	AGCCTGTGCATCACGTATGCAGTTGACCCATGGATCCTGGTTACCTATACTGATGA	1080
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Db	2870	AGCCCCTGAGTGGCCCGTTGGACGGTGGACCCTGCTGACCATCCGAGGAAGGAACCTGG	2929
Qy	2221	GCCGTCGGCTCAGTGATGTGGCACATGGTGTGGATTGGCAGTGTGGCCTGTGAACCCC	2280
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Db	2990	TGCCTGACAGATAACACGGTGTGGAGGAGATCGTGTGTACAGGGCAGCCCCAGGAC	3049
Qy	2341	CCTTCTCAGACGTGTAACGGTAAACGTCTCCAAGGAAGGCAGGTCTCGGAACAGTTCT	2400
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Qy	2401	CCTATGTGCTGCCACGGTCCACTCACTGGAGCCTCCATGGGCCAAAGGCCGGGGTA	2460
Db	3110	CCTACGTGCTGCCCTGGTCCACTCCCTGGAGCCTACCATGGGCCAAAGGCCGGGGCA	3169
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Db	3650	TGGACCCCGAGGAGGCACAGCGGGCAGCAGGTTCCGCCTGGACTACCTCCCCAACCCAC	3709

Qy	2995	AGTTCTCCACAGCCAAGAGGGAGAAGTGGATCAAACATCACCCAGGAGAGCCGCTCACCC	3054
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Db	3770	TCGTTATCCACAAGGAGCAGGACAGCCTGGGCTCCAGAGTCACGAGTACCGGGTCAAGA	3829
Qy	3115	TTGGCCAGGTGTCCTGCGACATCCAGATCATCTCAGACAGAGTCATCCACTGCTCAGTCA	3174
Db	3830	TAGGCCAAGTAAGCTGCGACATCCAGATTGTCTCTGACAGAATCATCCACTGCTCGGTCA	3889
Qy	3175	ATGAGTCGCTGGCACGGCTGAAGGACAGCTGCCATCACAATCCAGGTGGGAACTTCA	3234
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Qy	3715	TCAACACAAGCACTTCCCTATCGTCTTGTCCATGCTCTGGAGCAGCAGAAGGACTTC	3774
Db	4430	TCAACACAAGCACTTCCCTATCGTCTTGTCCACCGCCTGGAGCAGCAGAAGGACTTG	4489
Qy	3775	CAGTGC GTGACAGGTGCAGCCTGGCGTCCCTGCTGACCATCGCGCTGCACGGCAAGCTGG	3834
Db	4490	CGGTGCGCGACAGGTGCAGCCTGGCCTCGCTGCTGACCATCGCGCTGCACGGCAAGCTGG	4549
Qy	3835	AGTACTATACGAGC ATCATGAAGGAGCTGCTCGTGGACCTCATCGACGCCTCGCGGCCA	3894



Db	5390	TCAAGTACTTTCGACTCCTGGAGGAGCAGGCTGAGAAGAGGGAACTCCGACCCCG	5449
Qy	4735	ACACCCCTGCATATCTGGAAGACCAACAGCCTTCCCCTGCCTCTGGGTGAACATCTAA	4794
Db	5450	ACACCCCTACACATCTGGAAGACCAACAGCCTTCCCTCCGGTCTGGGTGAACATCCTGA	5509
Qy	4795	AAAATCCCCAGTTGTCTCGACATAGAGAAGACGGACCACATCGACGCCGCCTGTCTG	4854
Db	5510	AGAACCCCCAGTTGTCTTGACATCGACAAGACAGACCAACATCGACGCCGCCTTCAG	5569
Qy	4855	TCATCGCACAGGCCTTCATCGATGCCGTCTCCATCTGACCTGCAGCTGGCAAGGACT	4914
Db	5570	TCATCGCGCAGGCCTTCATCGACGCCGTCTCCATCTGACCTGCAGCTGGCAAGGATT	5629
Qy	4915	CACCCACCAACAAGCTCTGTACCGAAGGAGATCCCTGAGTACCGGAAGACCGTACAGC	4974
Db	5630	CGCCAACCAACAAGCTCTACGCCAAGGAGATTCTGAGTACCGGAAGATCGTGCAGC	5689
Qy	4975	GCTATTATAAACAGATCCAAGACATGACGCCGCTCAGCGAGCAGGAAATGAACGCACACC	5034
Db	5690	GCTACTACAAGCAGATCCAGGACATGACGCCGCTCAGCGAGCAAGAGATGAATGCCCATC	5749
Qy	5035	TGGCCGAGGAGTCTGGAAATACCAAGAATGAGTTCAACACAAACGTGGCCATGGCTGAGA	5094
Db	5750	TGGCCGAGGAGTCGAGGAAATACCAAGAATGAGTTCAACACCAATGTGGCCATGGCAGAGA	5809
Qy	5095	TTTATAAATATGCTAAGAGGTATCGACCACAGATCATGGCTGCCCTGGAGGCCAACCCCA	5154
Db	5810	TTTATAAGTACGCCAAGAGGTATCGGCCGAGATCATGGCCCGCTGGAGGCCAACCCCA	5869
Qy	5155	CAGCCCGCAGGACCCAGCTACAGCACAAGTTGAACAGGTGGCTCTGATGGAAAACA	5214
Db	5870	CGGCCCGGAGGACACAACACTGCAGCACAAAGTTGAGCAGGTGGCTTGATGGAGGACA	5929
Qy	5215	ATATCTATGAGTGTACAGCGAGGCCTGATGCAGAAGAGTGCAGCAGGAGCTCGGCCAGG	5274
Db	5930	ACATCTACGAGTGCTACAGTGAGGCCTGAGACACATG-GAGAGTTGGTCAGGCTGCTGCT	5988
Qy	5275	GAGACGGCGTGCAGGCCACTTGGCTCCACTTGGT-TTCTTCCCCACATCTCACTTGG	5333
Db	5989	GGGAGAAATGGACGCCACTGGCCTCAACTTGATCTTACCCGTGCCTGTGACTCAG	6048
Qy	5334	GCTGGGAACGTACAGAGGAGCCTGCTGGCTAGGAGTGGGGACACTGGCCTCTAGTGC	5393
Db	6049	ACTGGGAAATACTGAGCAGAGACGGCTGGGGCGGGGCAGGAGGAGGGCTGCTCTG-	6107
Qy	5394	CCGGCTGCCGAGCTTGGCCTTGTCCCCCTGGGCATCTCTGCCCCCTCCACCTGCCAA	5453
Db	6108	-AGACAGGGCGCCCCCGCCTGACCCCTGGCACCTCCATCCCCTCCACCTGTCCCCA	6166
Qy	5454	GACCCAACCTAGGATGAAGGCCTTGAATATCGATCG-----CTGCCAGTCCCTA	5503
Db	6167	GATCAGTCTCTGGATGGAGGCCAGAGAGCTGGTCAGGCTCCCCATCTGCCAGCACGG	6226
Qy	5504	ATAAGACTTTCCCTGCCAACCAAGGACAGCCTGGACCATGCCTGCCTGTTCACTGT-----	5558
Db	6227	CCTGCACTGTGCCAACCACTTGCTCCACAAACGTCCAGTTGGTCCTGCTGCCAAGAGCCC	6286

Qy	5559	-----TTCAGGCTGCTCAGCACACATTGGGAGAG-----	GTGGCCAT	5595
Db	6287	CGTGCATCCAGCGGCCAAGCACAACTGGGGAGAGGAGGCCAGCCGGAGGCTGC		6346
Qy	5596	ATCCCAG-AACACTACCTCATCCACCTGGCAGAGGGAA-----		5632
Db	6347	AGCCCAGAAACTCTACCTCATCCACACTGGTGCAGGGAGCCCTCCTGAACGTACCTTG		6406
Qy	5633	-----TTTCTGCTTCAGCCACCAAGCAGTTGTCT---	GTGTCCCTCATCCAGAGGGGC	5683
Db	6407	ATTGGTTCTGCTTCAACTACCAAAATGTTATCTCCACTCCCCCTCACCCGTAGAGGAT		6466
Qy	5684	CTTGGCCACCAACAGTTCAAACCAAGGTAGCTGTAGCCGTCTCATTGCCAGTGGCAG	5743	
Db	6467	CCTGGCCACAGACAGTTCAAGTAGTGTAGCTGGAGTTTGCTTGGCGGCTGTTGGTAG		6526
Qy	5744	CATGGGCAGTGCCCATTGC-----	CCACAGAACGGTGGAGAGAGG	5783
Db	6527	AGTGGGCAGTGCCCAGCCATGGGTGCTCTGTGGCTTCTCCAGGAGCAGGGAGGGTAG		6586
Qy	5784	GGGACAGGCTGGGG-----	TTCCTGGCCCCAGGAAAGGGAGGAAGGCG	5827
Db	6587	AGGGGAGGGATGGGGGGCACAGGAGCTGGAGCCCCGTCTCCAGGAAAAGGAGAGGGTT		6646
Qy	5828	AGGATGCAG---GGCTGTAGCTGGACTACTCAGTCTTCTGGAAGTGTCTAAAGAGCA	5884	
Db	6647	AAGATGCACCGAGGCTGTAGCTGGCTACTTGATCTGCTGAAAGTGTCTAAAGATAG		6706
Qy	5885	CCACTTTTTTGTTTTTAAGAAAAAAAAACTTTATATATTAAAACAAAA	5944	
Db	6707	CACCACTTTTTTAAAGCTTTATATATTAAAACGTATCATGCACCAACTGTGAA		6766
Qy	5945	ACTTATGCACCAACTGTGAATAGCTGCCGTTGTGCAGATCCCCAGGGCTCCGGTGAC	6004	
Db	6767	TAGCTGCCGCT----TGCGCAGAGGACCCGGGGAGGGTCCGAGAGGCTCCCCATGCA		6821
Qy	6005	ACACTGGAAATGACTGTTCCAGGGACAG	6033	
Db	6822	ACACTGGAAATGACTGTTCCAGAGAGCGG	6850	